

of the embryo a funnel-shaped opening, circumscribed by the blastodermic pad and corresponding to the canal which is seen in the trout.

Kupffer's vesicle only appears in the perch after the disappearance of the closure-canal of the blastoderm. It has the same situation and the same form as in the stickleback. In a living embryo I have distinctly seen, at its posterior part, on its dorsal surface and above the vesicle, a small orifice with folded borders, which is very probably the aperture of invagination of the vesicle; but as yet I have unfortunately been unable to assure myself, by sections, of the continuity of this orifice with the vesicle, so as completely to confirm Kupffer's description.

Prof. Balbiani, who has verified my observations, agrees with Balfour and Rauber in regarding Kupffer's vesicle as the homologue of the primitive intestine of the Cyclostomi and Batrachians, its external orifice representing the anus of Rusconi. As to the canal originating from the closure of the blastoderm, it corresponds to the blastopore of English writers, or to the mouth of the gastrula of Hæckel. In the Batrachia the blastopore and the anus of Rusconi are confounded; in the fishes these two orifices are distinct.—*Bull. Soc. Philom. de Paris*, April 10, 1880.

Completion of the Biology of the Aphides of the Galls of the Poplar
(*Pemphigus bursarius*, Linn.). By M. J. LICHTENSTEIN.

In his former paper on this insect* the author was compelled to leave a gap in its history, namely the life of the insect from the time of its quitting the gall as an emigrant until its return to the trunk of the poplar as a pupiferous form.

After unsuccessful attempts with the roots of grasses and other plants, it occurred to him to try *Filago germanica*, he being led to select that plant because while he only knew the first two stages (founder and emigrant) of *Pemphigus bursarius*, he only knew the last two stages (gemma-parous and pupiferous) of *Pemphigus filaginis*, Boyer. With this purpose he covered a plant of *Filago* with a bell glass, and enclosed with it a poplar-gall filled with winged emigrants. The plant was soon covered with the woolly secretion of *Pemphigus filaginis*. At the same time (from 1st to 15th July) all the plants of *Filago* growing in the open round the bell glass were covered with the same secretion and with the green and velvety black Aphides constituting the gemma-parous phase † of that insect.

The development of the winged pupiferous form proceeds very rapidly; three weeks suffice for it. On taking into his study the bell glass and the plant of *Filago* covered by it, the author saw the

* See 'Annals,' May 1880, vol. v. p. 433.

† In this species the gemma-parous phase is simple, and not multiple as in *Phylloxera vastatrix*; and all the individuals proceeding from it are winged.

winged insects quit the capituli on which they had been developed and seek to escape from the bell glass. He then inserted a fragment of poplar-bark under the bell, when the Aphides at once collected upon it and began producing sexual individuals. The same thing was done by individuals which had been allowed to fly and had collected on the window-panes. The poplars in the garden were at the same time covered with these Aphides.

In conclusion M. Lichtenstein calls attention to a possible objection to his experiment, viz. that he did not grow the *Filago* from seed under cover—and promises to remedy this defect next year.—*Comptes Rendus*, August 9, 1880, p. 339.

On the Ciliated Embryo of Bilharzia. By M. J. CHATIN.

The regularly oval egg of *Bilharzia* (*B. hæmatobia*, Cobb., the African Trematode parasite in the blood of man) presents no traces of striæ or flutings; but at one of its poles it bears a conical prolongation*. The segmentation of the vitellus takes place rapidly, and we soon witness the formation of an embryo of very characteristic aspect.

Clothed with a cuticle, from which innumerable vibratile cilia emerge, the young larva appears like an infusory contained within the egg, and the interior mass of which does not yet present any indication of differentiation; externally the contours become more strongly marked, and a sort of mamilla (proboscis) begins to indicate the future cephalic region. This general state usually persists until the period of exclusion†; and the latter is announced by various precurrent acts, into the details of which I cannot enter, and then makes itself plain by important organic modifications: beneath the proboscidian zone there is sketched out a cæcum, which plunges vertically into the somatic mass, and soon attains considerable dimensions; on its lateral parts appear secondary diverticula, which together form a rather complex whole, whilst at different parts of the body, and especially in the tegumentary layer, elegant vasculiform streaks ramify.

During this time phenomena of a very different kind appear towards the posterior extremity of the body; peculiar formations, generally spheroidal, begin to show themselves there, and increase rapidly in number and volume. Are we to see in these only "sarcode globules"? Such a hypothesis disappears before the application of a method rendered classical by important researches (Ranvier, Certes, &c.); the mode of grouping of the nitrogenous,

* In all the eggs that I have been able to examine, this prolongation was distinctly axial; but it is well known that Bilharz has described a second kind of ovules with the point lateral, in which, indeed, Sonnino even appears to find an indication of an actual specific duality.

† Sometimes, however, one can distinguish the first lineaments of the cæca even in the embryo still contained within the egg.